



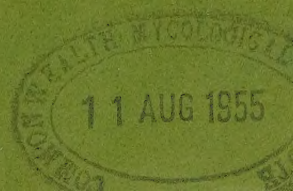
ZANZIBAR PROTECTORATE

Annual Report
of the
Department of Agriculture
1954

ZANZIBAR

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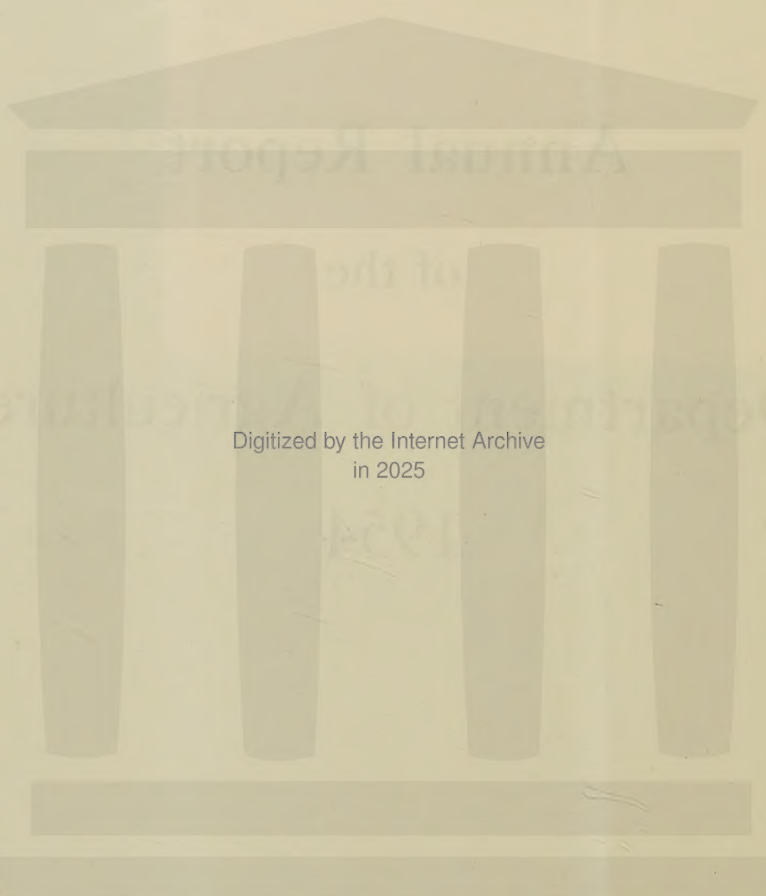


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GOVERNMENT OF ZANZIBAR



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ZANZIBAR PROTECTORATE

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SECTION A. AGRICULTURE IN THE PROTECTORATE

1. GENERAL

The splendid clove harvest of 1953-54 came to an end early in 1954 although cloves continued to arrive at the market throughout most of the year. This clove crop was the second biggest on record for the Protectorate and the largest ever picked in Pemba Island. Although prices remained at a comparatively steady level in the rather uninspiring range of Shs. 200 to Shs. 250 per cental, the size of the crop was such that there was general prosperity throughout the year. Indeed the 1953-54 crop brought the sum of over five million pounds to producers, pickers and others whose livelihood is connected with cloves. In terms of the value of the crop, this was by far a record.

There were ample supplies of imported foodstuffs, but poor rains and the general affluence which resulted from the large clove crop seriously reduced the quantity of home-produced food especially rice. The price of imported rice has fallen steadily, and at the end of the year it was difficult to convince local cultivators of the wisdom of planting their own rice. Cassava flour and other less attractive staple foodstuffs were sold in comparatively small quantities. Sugar was de-rationed at the end of January with very little disturbance to normal rates of consumption. The year has been strongly reminiscent of the pre-war days of cash-crop economy, when cloves were regularly exported to the Far East whence came a sufficiency of cheap imported rice.

2. WEATHER

Although the weather was not so unfavourable as the drought year of 1952, there has been a grave shortage of rain and the more important of the two wet seasons was practically a failure. The early months of the year were very dry and hot and the *masika* rains were about a month late in starting. For this reason planting conditions were not suitable until towards the end of April. The heavy rains ceased abruptly in the last week of May, and dry windy conditions obtained throughout the rest of the year until late but very welcome *vuli* rains helped to make up for the shortage during the last few weeks of the year. On the average, 1954 rainfall was about two-thirds of that received last year.

As a result of this poor rainfall the establishment of permanent crops in the field has been most difficult and large numbers of clove and citrus seedlings became casualties. Local food supplies have also been much reduced, and grazing for livestock became severely restricted at times.

Rainfall figures for the several stations in Zanzibar and Pemba are shown as Appendix V to this report.

3. PRINCIPAL CROPS

Cloves.—The 1953–54 crop was probably the biggest ever picked but, in terms of the cloves brought to market between 1st July, 1953, and 30th June, 1954, it was beaten only by the record crop of 1937–38 when 1,350,000 *frasilas** were marketed. This year the total came to 1,281,185 *frasilas* of which 1,101,302 or 86 per cent came from Pemba. This contribution was a clear record for Pemba and provided a salutary reassurance that the diseases of the clove tree, which have been much publicised of late, are still far from causing a reduction in Pemba's total output.

The vigorous and sustained publicity campaign against the breaking of branches while harvesting, a practice that provides conditions for the spread of die-back disease and also leads to irregular and reduced bearing, was a marked success, and the damage done by pickers this year was relatively small in spite of the large crop. The effect of this increased care in harvesting was a welcome little crop for 1954–55 and signs of a medium crop in the following season judging from the physical appearance of the trees at the end of the year. The current crop is estimated at 350,000 of *frasilas*, and by the end of December some 246,454 *frasilas* had been brought to market.

One of the most striking features of the bumper clove crop was the popularity of the clove deposit service offered by the Clove Growers Association whereby producers may store their cloves in the Association's warehouses for a small charge. Under this system growers receive an advance of about three-fourths of the Association's buying price on the cloves deposited and may thereafter sell their cloves at any time convenient to themselves and to any buyer. The Association also provides producers with the security of a fixed buying price, guaranteeing to purchase all cloves that may be offered for sale, and thus creates a floor to the market below which producers need not fear prices will fall. The Association's buying prices for the 1953–54 season were based on a price of Shs. 200 per 100 lb. of fair-quality cloves delivered in Zanzibar, and for the first time for several years a small quantity of cloves were purchased by the Association as open market prices fell to approximately the same level as the guaranteed buying price. The deposit system enabled growers to store a very large proportion of their cloves and the quantity of deposited cloves at one period exceeded 350,000 *frasilas* which, in terms of advances to producers, amounted to over a million pounds. The effect of this deposit system is to stabilise the market by slowing up the rate of deliveries of

*1 *frasila* equals 35 lb.

cloves for sale and thus avoiding a slump and a consequent fall in price. In many respects, therefore, the deposit system has as valuable an effect on the market as had the holding of large stocks of its own cloves by the Association.

On the 1st July the Clove Growers Association published its fixed buying prices for the season and these were unchanged from the previous season. Clove-stems also were purchased at the same prices as last season. Selling prices, which were nominal for the whole year, also remained unchanged. Open market prices showed relatively little fluctuation. The calendar year began with a price of approximately Shs. 212 per cental; this slumped a little in mid-year to Shs. 200, rose to just over Shs. 260 in the third quarter, and at the end of the year was about Shs. 234.

On the 1st September the export duty on cloves fell from Shs. 169 to Shs. 66 per cental and oversea buyers, who had expected a fall in duty as a result of last year's fall in the local market prices on which the export duty is based, came into the market in strength. By the end of the year, exports of cloves had reached some 9,856 tons, an increase of ten per cent over last year although the fall in prices reduced the total value of exported cloves by close on £2,000,000. Of these 48 per cent went to Indonesia and 27 per cent to India. Clove oil exports of 254,320 lb. went mainly to the United Kingdom.

Coconuts and Copra.—The quality of locally produced copra has been well maintained, indeed improved, over the year. The aim of producers is to market copra of sufficiently high quality to pass stringent inspection prior to export and thus to enjoy the relatively higher prices which are offered for exportable uncrushed copra. The price which local millers can afford to pay for copra of poorer quality, which cannot be exported and so must be crushed in local mills, is naturally less attractive. Thus the present range of prices provides an incentive to the go-ahead copra manufacturer and, at the same time, provides a valuable outlet for the produce of the less skilled.

Exports of coconut products for the year were as follows:—

		<i>Exports cwt.</i>		<i>Copra equivalent tons</i>
Coconut oil	...	79,540	...	6,628
Coconut cake	...	52,940	...	—
Soap	...	73	...	4
Copra	...	116,100	...	5,805
Total	...	248,653	...	12,437

In addition some 19,039 cwt. of coconuts were exported, roughly equivalent to 217 tons of copra, making 12,654 tons in all.

The year's export in terms of the copra equivalent was somewhat above average and this, considering the dryness of the year, was very satisfactory.

Local market prices declined throughout the year, good quality copra fetching Shs. 62 per 100 lb. in January and Shs. 48 at the end of the year.

The Copra Board, which administers the proceeds of the cess on exported coconut products for the benefit of the industry, continued its work although the resignation of the Arab members of the Board in June made its work more difficult in the latter part of the year. Nevertheless the Board provided much help to producers and commenced to set a high standard for locally produced coconut oil. This will be described in detail later in the report.

4. MINOR EXPORT CROPS

The small part played by minor export crops in the economy of the Protectorate continues to provide a major problem for the department. In recent years the percentage of the total value of domestic exports provided by clove and coconut products has been very high indeed, amounting last year to 99 per cent and this year to over 98 per cent. Although the clove crop may always be the mainstay of the Protectorate's economy and the coconut a reliable second string, especially in the less fertile areas, the lack of other supporting crops cannot be viewed with equanimity. Although there is no loss of confidence in cloves and coconuts, it has become more and more the policy of the department in recent years to encourage farmers to go in for a greater variety of cash crops. While it is hoped that the work of the department in this respect has not been wasted, there has been very little response on the part of landowners and cultivators, and the need for crop diversification is as great as ever.

Chillie exports fell to 25½ tons, 32 per cent less than last year. The Clove Growers Association maintains a guaranteed minimum buying price of Shs. 70 per 100 lb. and open market prices rose to the very satisfactory figure of Shs. 200. The Department provided very large numbers of free seedlings to growers, but possibly as a result of the dry weather, which was most marked in the coral soil areas where chillies are grown, production fell.

Tobacco exports were also small but there was a useful export of 6,503 lb. of derris root and a very slight quickening of public interest in this most remunerative crop. A little cacao, mainly from Government plantations, was also exported and was sold in the United Kingdom at the splendid price of £530 per ton.

Seaweed exports were much increased and some 186 tons were exported of which 111 tons came from Pemba. This quantity, valued at over £9,000, also brought in a direct revenue of £930 in royalty. The prospects of the seaweed industry are much improved, mainly because of the keenness and perseverance of the principal exporter. At the request of the exporter,

samples from all consignments of seaweed are taken by the Inspector of Produce and sent for analysis at the chemical laboratory, and a certificate stating the moisture and extraneous-matter content is provided for a small charge. It is of interest that, even in this minor industry, the value of strict produce inspection is appreciated and sought for by the exporters.

5. FOOD CROP PRODUCTION

Rice and cassava were again the subjects of compulsory planting orders whereby able-bodied men who have no full-time employment are compelled to plant food-crops for their own personal use. The order in respect of cassava was followed by very adequate planting of this staple food-crop, but the results of the rice-planting order were disappointing and cultivators failed to plant the usual acreage in Zanzibar Island, although in Pemba the average acreage was maintained.

The failure of the main rains caused a large proportion of the rice to flower prematurely and crops were reduced. The rice crop for the Protectorate this year amounted to some 7,010 tons of paddy which represents only about 60 per cent of a normal crop. One of the chief reasons for the reduced rice acreage was the abundance of cheap imported rice in the shops and the comparative affluence of the rice-growers who are also clove-pickers and who had returned but lately from the clove harvest well supplied with cash. The lack of interest in rice-growing this year was also shown by the lack of sales of fertilisers for this crop in spite of the strong encouragement to use fertilisers on rice given by district staff. After the rice crop was harvested there were some good crops of sweet potatoes taken from the damper rice valleys but drought much reduced the planting of maize and sorghum on the coral soils of the east coasts of both islands.

Market garden produce such as vegetables and fruit was plentiful, although there was a sharp rise in prices. Staple starchy foods were also plentiful and prices showed a welcome decrease. The following table, which shows the quantities and prices of foodstuffs passing through the main market of Zanzibar town, indicates the trends of production and price:—

		1952		1953		1954
Vegetables, baskets	...	102,213	...	77,695	...	95,188
Average price per basket	...	Shs. 4.33	...	Shs. 4.53	...	Shs. 5.85
Fruit, baskets	...	94,337	...	155,570	...	161,758
Average price per basket	...	Shs. 4.84	...	Shs. 4.38	...	Shs. 5.90
Staple starchy foods, baskets	...	183,393	...	157,092	...	197,402
Average price per basket	...	Shs. 8.45	...	Shs. 8.08	...	Shs. 7.10

6. ANIMAL HUSBANDRY

There were no major outbreaks of disease, the only setback of this nature being an outbreak of foot-and-mouth disease in Pemba in June. The place where the disease occurred, Kojani Island, was easy to isolate and was declared an infected area under the Diseases of Animals Decree. The disease took its usual fairly mild course; there were no deaths, and restrictions were lifted in November. Foot-and-mouth disease also occurred in the Zanzibar quarantine station amongst dairy cattle imported from Kenya but the disease did not spread outside.

The itinerant trypanosomiasis clinic treated more cases than ever this year and injections of antrycide methyl sulphate continued to be most efficacious. The increase in the number of cases reported is a clear indication of the increasing confidence felt by the public in the Veterinary Section especially in regard to its treatment of trypanosomiasis. There was no change in the East Coast Fever situation although interest was taken in some rural districts in spraying cattle as opposed to dipping in the control of this disease, and it is possible that the marked aversion to dipping shown by rural cattle-owners may change to an acceptance of spraying as a means of effecting tick control. A number of cases of redwater and anaplasmosis occurred in dipping areas. The Veterinary Officer also noted the relatively high percentage of reactors amongst imported grade dairy cattle when tested for brucellosis.

Importations of animals, mainly for meat, compared with previous years, are shown in the following table which includes the very small numbers imported directly into Pemba:—

		1952		1953		1954
Cattle	...	3,463	...	5,208	...	4,784
Goats	...	11,111	...	14,519	...	14,889
Sheep	...	2,100	...	2,501	...	2,150
Donkeys	...	6	...	17	...	107

These figures are not remarkable, except perhaps the import of donkeys. Pemba also sent quite a large number of donkeys to Zanzibar this year.

The following tables show the numbers of animals recorded as having been slaughtered for meat:—

Zanzibar Town Abattoir

		<i>Oxen</i>	<i>Cows</i>	<i>Calves</i>	<i>Goats</i>	<i>Sheep</i>	<i>Pigs</i>
Local stock	...	207	60	68	2,688	1	7
Imported stock	...	3,751	25	1	12,342	2,231	—
1954 Total	...	3,958	85	69	15,030	2,232	7
1953 Total	...	3,653	159	20	2,685	2,250	6
1952 Total	...	2,925	168	63	11,501	2,266	84

Other Areas

(Cattle only and figures approximate)

		1952		1953		1954
Pemba rural areas	...	1,130	...	2,294	...	1,979
Pemba townships	...	918	...	1,118	...	1,457
Zanzibar rural areas	...	435	...	401	...	447
Total	...	2,483	...	3,813	...	3,883

These figures show that the consumption of meat in the Protectorate continues to increase. It should be remembered, however, that the increased purchasing power resulting from the large clove harvest lasted throughout most of the year. In Pemba there were periodic shortages of

meat, mainly because local cattle-owners were unwilling to sell their animals at reasonable prices. Pemba could easily be self-supporting for meat but, because most of the cattle-owners are themselves clove-owners or pickers, they are unwilling to sell their cattle, which represent capital reserves, when they are not in need of cash.

Hides and skins are still marketed through the agents in Dar es Salaam with apparent satisfaction to local producers. In Zanzibar Island the Government hides and skins drying shed was operated by the department, and the following numbers were prepared during the year:—

		<i>Hides</i>		<i>Skins</i>
From abattoir	...	4,081	...	17,208
From rural areas	...	618	...	3,336
Total	...	4,699	...	20,544
1953 Total	...	4,349	...	18,107

In Pemba all the hides and skins drying sheds have been handed over to local butchers who pay a nominal rent and organise their own preparation and drying. The total value of hides and skins exported this year was £10,925 almost exactly the same as the two previous years.

SECTION B. THE WORK OF THE DEPARTMENT OF AGRICULTURE

1. STAFF

The Director, Mr. A. K. Briant, was on duty in the Protectorate until he went on leave on 13th November, when charge of the department was taken by the Senior Agricultural Officer, Mr. G. E. Tidbury. Mr. R. K. Tremlett was in charge of agriculture in Pemba Island until 17th November, when he handed over to Mr. D. W. Winter who had been on leave. Mr. Tremlett then undertook the duties of Senior Agricultural Officer at headquarters. The Zanzibar District suffered throughout most of the year from the lack of a District Agricultural Officer although some supervision to district work was given by the Senior Agricultural Officer assisted by Mr. O. de Manbey. The Kizimbani Experimental Station on the other hand had full-time supervision from Mr. K. A. Bowden for the whole of the year and considerable progress was made at the station for this reason.

Amongst the specialist officers, the Veterinary Officer, Mr. A. Rashid, and the Assistant Agricultural Officer-in-Charge of the Tsetse and Trypanosomiasis Survey, Mr. Othman Shariff, were on duty throughout the year. The Entomologist, Dr. F. L. Vanderplank, was on leave for the greater part of the year, his section being looked after by the Senior Agricultural Officer with the assistance of Mr. L. J. Stevens. Mr. T. A. Couppis, Forest Officer, went on leave on 7th June, and his assistant, Mr. A. A. Wadud, undertook the maintenance of the forestry activities. The Fisheries Officer, Mr. K. F. King, was on leave for the greater part of the year and fisheries activities were largely in abeyance.

The Field Supervisor of the Fruit Scheme, Mr. I. G. C. Squire, was on duty until 6th November, when he went on leave and handed over his section to the care of the Senior Agricultural Officer. Mr. T. E. C. Robins, Manager of the new scheme for the Experimental Control of Clove Diseases, was on duty throughout the year as were Mr. A. C. E. Callan, M.B.E., Inspector of Produce, and Mr. Ali Khamis, Manager of Government Plantations. Mr. L. Paul, Head Clerk, was in charge of the Head Office clerical staff throughout the year. The post of Government Chemist remained unfilled.

1954 was a difficult year in respect of staff for there was a serious shortage of field officers, while certain parts of the development programme were retarded owing to the absence on leave of specialist officers. The year was also noteworthy for the implementation of the Report of the Commission on the Civil Services of the East African Territories. Further regrading is now in progress under which a fresh assessment is being made of the relative qualifications and responsibilities of departmental officers. There has been a welcome improvement in terms of service especially of locally-born officers who had received higher education and advanced training in Britain and elsewhere.

2. THE DEVELOPMENT PROGRAMME

There were no major changes in the Development Programme during the year except that Insect Research, which had been a charge on Protectorate funds pending the approval of a new Colonial Development and Welfare Scheme, received a grant of £22,800 from which expenditure on the work in 1953 to 1954 will be recouped. The Tsetse and Trypanosomiasis Survey Scheme came to an end and extension of this work on an enlarged scale has been provided for in the form of a Tsetse and Trypanosomiasis Scheme financed from Protectorate funds. This extended scheme contains a new major project in the utilisation of a second *uwanda* plain for the production of beef as a practical consequence of tsetse control.

The 10-Year Development Programme, which was formulated in 1946 and which has been amended and augmented from time to time, is now nearing its close and attention has been given to the future of the various projects. A further programme to cover the period 1955–59 and an estimate of its financial needs were prepared. Much of the development work has now become an inextricable part of the normal routine activities of the department, and provides the subject matter of the major part of this report. The year's progress in the many spheres of development is considered below under subject heads.

3. CROP HUSBANDRY

Cacao.—There has been a major change in the policy regarding the development of cacao as a subsidiary export crop. Hitherto the planting of *criollo* cacao had been encouraged because it was considered that the better quality of this variety, compared with *forastero*, would ensure a ready market and a relatively high price at all times, and that this would outweigh the disadvantages of lower yields and less vigorous habit of growth for a country which, by reason of its size, can never hope to produce large quantities of cacao. But for several years, during which the department has encouraged cacao planting, the difficulty of establishing the *criollo* variety, its lack of vigour and its restricted crops have been very apparent. Experiments planted some years ago to ascertain the relative difficulty of establishing *forastero* and *criollo* now indicate very clearly that *forastero* is much the easier variety to grow and that it produces more cacao. Moreover the world shortage of cacao and the very acceptable quality of the local *forastero* type make it less likely that the prices obtainable in the future for *criollo* will be so much greater than for *forastero*. For these reasons it was decided during the year to stop producing planting material of *criollo* and to turn wholly to *forastero*. The source of *forastero* seed to be used is a block established many years ago from an unknown source on one of the Government plantations. As an earnest of this change of policy four acres of *forastero* cacao were planted at the Kizimbani Experimental Station and, in spite of the very unsuitable weather this year, this block has made remarkable progress and is growing well with a minimum number of casualties. Part of this block has been planted with separate rows of seedlings derived from seed of individual trees in the seed block.

All the cacao produced this year on Government plantations and on privately-owned land was bulked and fermented in the Government fermentary and sold on the London market with the assistance of the Clove Growers Association. This cacao was sold at the remarkably high price of £530 per ton c.i.f.

Cassava.—The hybrid varieties received from Amani in 1950 were again the subject of variety trials and this year's results were of considerable interest in that the department's standard local variety *msitu* was significantly outclassed by several of the hybrids. Two experiments were reaped and from both it was clear that Amani varieties Nos. 4674/4, 46106/27 and 46106/26 are superior to *msitu* in yield and in their degree of resistance to mosaic disease. They are apparently now quite palatable although they were classed as bitter in earlier trials. All three are third back-crosses between *M. glaziovii* and cassava. These three varieties are now being bulked for distribution to the public. Full results of the variety trials are given in the experimental supplement to this report.

Work continued on the second batch of Amani hybrids received in 1953; these are being multiplied up to the variety trial stage. It is noteworthy that the behaviour of new cassava varieties, particularly as regards palatability, is usually most variable during the first few years and tests made after the first year's harvest are not to be relied upon.

A fertiliser experiment with cassava was laid down at Kizimbani.

Chillies.—The demand for free chillie seedlings from nurseries maintained by the department with funds provided by the Clove Growers Association was less than usual owing to the very dry weather, although 204,584 free seedlings were distributed in Zanzibar Island.

Citrus.—The second annual distribution of budded material in the Citrus Fruit Industry Scheme was not so successful as the first, owing to the dry weather and also to the damage done by "withertip" in the nursery before the disease was diagnosed and brought under control. Citrus scab on the rough lemon stocks was also the cause of trouble in the nursery until it was found that damage from scab is much less when the stocks are grown under light shade. Nevertheless, at the end of the second of the three seasons of the scheme, the total number of plants distributed is well up to schedule as is shown in the following table:—

			<i>Oranges</i>		<i>Grapefruit</i>		<i>Lime</i>		<i>Mandarins</i>
Distributed, 1953	...	...	9,127	...	2,310	...	25,827	...	710
" 1954	...	...	5,046	...	394	...	15,574	...	330
Total	...	...	14,173	...	2,704	...	41,401	...	1,040
Balance to complete scheme (1955 distribution)	...	...	6,827	...	—	...	15,599	...	2,460
Total for scheme	...	...	21,000	...	2,500	...	57,000	...	3,500

From this table it will be seen that the grape-fruit quota is complete: only mandarins, which have proved difficult to bud, are behind schedule. Budding continued for the third and last annual distribution to be made in 1955.

The majority of the citrus blocks established by private plantation-owners under the scheme have been fairly well looked after and many now present a very pleasant appearance. The most serious problem is that of fire. Grass fires in the dry season are common in Zanzibar every year and have been particularly bad during the recent very dry periods. Although planters have been regularly advised to maintain fire traces around their blocks of trees, as many as ninety-six acres planted under the scheme have already been destroyed by fire.

The 20-acre Government demonstration plot at Dole has made splendid progress and the first small crop of limes was reaped at the end of the year. "Withertip" disease has caused less damage this year, probably owing to the dry weather, and it is hoped that by protecting the trees during flowering by copper sprays it will be possible in the future to obtain good crops of limes in spite of the disease.

At Kizimbani Experimental Station the citrus harvest was the heaviest for over ten years: 183,711 oranges and 7,234 grapefruit were reaped from 496 and 63 trees respectively. There is still serious fruit-fall of almost ripe oranges and some 40,000 were lost in this way this year. Part of the orchard was deeply trenched to ascertain whether water-logging was a cause of fruit-fall but the meagre rains did not allow any useful observations to be made. An experiment was made, however, in which a number of trees were sprayed with a very dilute solution of 2, 4-D and this had a marked effect in reducing fruit-fall in spite of the application being made when the fruit was almost fully ripe. It is intended to extend these investigations into the prevention of premature fruit-fall next year.

Cloves.—Work under the new scheme for the Experimental Control of Clove Diseases commenced during the year in Zanzibar Island. The Zanzibar experiments are intended to ascertain whether plantations recently decimated by Sudden Death can be successfully replanted with cloves. It is hoped that one or more of the soil treatments being tried in these experiments may enable the next generation of cloves to resist attack by the fungus that may prove to be the causal organism of Sudden Death and which appears to manifest itself also in young trees in the form of "slow decline". Four blocks, each consisting of four acres of good clove land which had been devastated during recent years by Sudden Death, were carefully selected. In all four blocks the dead and dying trees had to be completely removed and an endeavour made to remove also all the roots of the dead trees. In two of the blocks this task was comparatively easy, but in the third block the depth and ramifications of the roots were such that complete removal was found to be impossible. The experimental design of this plot was therefore modified to provide for the removal of all roots in the top three feet but the other roots some of which had penetrated to a depth of seven feet or eight feet were left. In order to obtain additional

evidence as to whether the complete removal of all roots is essential or not, the fourth block at Mbaleni was divided into halves, in one of which only the surface and larger roots were removed while in the other half the land was cleared thoroughly of all roots. After removing the roots, the land in all blocks was sub-soiled and harrowed and then treated with dressings of lime at various levels. The cost of root removal in the two blocks where complete clearing was possible worked out at between Shs. 2,500 and Shs. 3,000 per acre. But in the third block, in which the complete removal of roots was abandoned, the cost had already risen to more than Shs. 5,000 per acre. The experimental programme provides for the planting of clove seedlings after one, two and three years in order to ascertain whether liming combined with deep cultivation for a long period before replanting will enable the new trees to remain free from disease. The plots to be planted with cloves next year were planted with nurse crops of tannias and bananas in the *vuli* rains this year. A perimeter trench has been dug around each block.

The experiments in Pemba, which are to be commenced in 1955, will be concerned with the control of active outbreaks of Sudden Death.

At Kizimbani Experimental Station the valuable effects of side protection, overhead shade and particularly of clean weeding continue to be very noticeable in certain blocks of clove saplings which had recently been in danger of the loss of condition known as "slow decline". There appears to be good reason to suppose that "slow decline" depends partly on the physiological condition of the clove sapling.

In Pemba and on the Government plantations in Zanzibar Island, the control of die-back disease by pruning and the protection of exposed tissues has been demonstrated throughout the year and there is undoubtedly an increased public interest in this work. It is certain too that the several years' publicity given to this disease, its cause and cure, has had good effect, and clove-owners and pickers alike now realise that the severe breaking of branches during harvest leads to die-back. The greatest publicity was again given to this matter during the clove crop and the decrease in this harmful practice is very noticeable.

An analysis of the expenditure on die-back control in the Government plantations has indicated an average cost of Shs. 2.32 per tree for over 6,000 trees treated during the year. These, of course, are mostly young trees where the extent of the disease is limited. Furthermore, it was found in Pemba this year that the necessary tidying up of broken branch ends and new points of infection at the end of the clove harvest could be done for a very small cost and with inconsiderable labour where the trees had already been treated.

A large part of the work of the department has again been the production of more than a quarter of a million selected clove seedlings for distribution to the public. The financial provision for this work has come from Protectorate funds, from Colonial Development and Welfare grants and from the Clove Growers Association. In Zanzibar some of the replanting of old

clove areas has been undertaken under the auspices of a rehabilitation scheme launched by the Clove Growers Association in which planters who maintain their young trees in a healthy condition receive a bonus. In Pemba, at the wish of the clove producers there, the Clove Growers Association grant has been utilised for the production of larger numbers of free seedlings and for the improvement of roads in clove areas rather than for a bonus scheme, which Pemba people felt would benefit relatively few. In all, the following seedlings have been issued during the year:—

			<i>Free</i>		<i>Sold for 5 cts. each</i>		<i>Total</i>
Pemba	...	...	69,625	...	52,783	...	122,408
Zanzibar Island	...	...	42,850	...	115,850	...	158,700
Total			112,475	...	168,633	...	281,108
1953 Total			57,516	...	185,683	...	243,199

Coconuts.—The department was again responsible, on behalf of the Copra Board, for the production of coconut seedlings for issue to the general public. Some 215,338 seedlings were sold for ten cents each, a rate which is approximately one-third of the cost of production. The Copra Board, of which the Director of Agriculture is the Chairman, is a public body with an unofficial majority which administers the funds obtained from a small cess on exported copra products for the good of the industry. In addition to the production of coconut seedlings the Copra Board also assists copra makers, who wish to build improved types of copra-kilns, by providing skilled masons without charge and by selling certain kiln-building materials at cost price. The major work of the Copra Board, however, is running the Coconut Products Factory at Mtoni. This factory demonstrates the production of high-quality copra, coconut oil, cake and coir. The factory is still in its infancy and has been established in the face of considerable difficulty. The production of copra and coconut oil has been in progress most of the year and a very excellent product is obtained. Fibre production has just commenced, and the factory manager has recently turned his attention to the experimental production of coconut-shell charcoal.

A consignment of dwarf coconuts from St. Lucia was received but the nuts failed to germinate. A one-acre block of a local type of dwarf coconut was planted at Kizimbani. In addition to the other virtues of dwarf coconuts it is thought that disease control would be much facilitated by the dwarf habit although this advantage would undoubtedly be to some extent offset by a greater liability to theft.

Considerable progress has been made in the investigations into coconut pests being undertaken by the Insect Research Section of the department. The chief pest, hitherto called *Theraptus* sp., has now been named *Pseudo-theraptus wayi*. This sucking bug causes premature nut-fall and both distorts and reduces the size of mature nuts. The pest also occurs on the mainland coast and a committee, consisting of the Zanzibar Director of Agriculture and Entomologists from Kenya and Tanganyika, has been set up to co-ordinate research on this important pest. The direct approach

to the problem by insecticidal spraying is making slow but sure progress and applications of a solution of DDT and resin in a mixture of dieselene and kerosene have effected a considerable reduction in the amount of damage and appear to have caused a noticeable increase in yield of coconuts in certain experimental plots. Other formulations are being tested and consideration is being given to the phytotoxic effects of the various solvents which can be serious when heavy doses are applied.

No aerial spraying was carried out this year but yield figures, obtained a year or more after the 1952 aerial spraying, have shown a temporary increase in yield which is attributed to the spraying. Mist-spraying from the ground has been carried out with a number of formulations and patterns of application, but this work has been handicapped during the year by the lack of a really powerful spraying machine and by the difficulty of keeping a spraying machine in good working order. There is little doubt that mist-spraying, even with its several difficulties and limitations, can achieve increases in the yield of coconuts.

In addition to yield increases the effects of spraying have also been manifested in ecological changes in the ground fauna of the sprayed areas and in the relative numbers of the different ants which infest the palms. One of the most valuable effects of the 10 DRDK formulation is that it appears to discourage the harmful ant *Anoplolepis longipes* and to cause an increase in the numbers of the predator ant *Oecophylla longinoda* which assists the control of *Pseudotheraptus*. For this reason as much consideration is now being given to the ecological approach as to the direct insecticidal method of control, for it is clear that beneficial ecological changes may lead, in the long run, to a more permanent and a more economic control of the pest.

Early in the year Dr. Kearns, of the Colonial Insecticides, Fungicides and Herbicides Committee, visited Zanzibar for discussions on the coconut pest research programme. After studying the problem he recommended the use of a more powerful mist-sprayer, which he kindly consented to design and build for us. Dr. Kearns also recommended a more exact study of the precise effects of the various insecticidal sprays on the pest, and also on the inflorescences and leaves, which can only be achieved by the use of an inspection ladder. This equipment has been ordered for delivery in early 1955.

The newly imported ant *Anoplolepis custodiens* continued to spread very quickly throughout the sandy areas around Zanzibar town and after careful investigation it was decided that any attempt at complete eradication would prove exceptionally costly and probably be unsuccessful. Moreover, although this ant undoubtedly causes much discomfort and is a serious nuisance to poultry and small animals, it seems very possible that it may assist in the control of *Pseudotheraptus* and so on balance be beneficial. An observational experiment to throw more light on its position in the *Pseudotheraptus* problem has been established.

Coffee.—Coffee was again the chosen plant for free distribution on tree-planting day and there is undoubtedly an increased interest in the local production of coffee. An experiment on mulching and the use of artificial fertilisers on coffee was established at Kizimbani, but it is as yet too early to observe any effect on yield. The Nganda type of *Robusta* coffee, introduced some years ago from Uganda, continues to grow quite well but without the vigour associated with *Liberica* coffee.

Derris.—In spite of an increasing demand from oversea markets and a very attractive price, it is difficult to interest local plantation-owners in derris. The Clove Growers Association continued to assist derris growers by packing and selling their root for them, and buyers' analyses have indicated that the derris root produced in Zanzibar normally has a rotenone content of about 7.6 per cent which earns an enhanced price since it is sold on a basis of five per cent rotenone. In round figures an acre of derris will produce about 1,000 lb. of dried root, worth Shs. 1/90 per lb. to the local producer. Much publicity has been given to this crop and it is possible to report a slight increase in interest. Nurseries for the production of free planting material were established at five places in Zanzibar Island, and three in Pemba, with funds provided by the Clove Growers Association, and a small co-operative society was formed in one rural area for derris planting. At Kizimbani investigational work continues into the fertiliser needs of the derris crop and into the best methods of producing planting material.

Maize.—Some of the early hybrids produced by the East African Agriculture and Forestry Research Organisation, and selected for resistance to the newly introduced rust *Puccinia polysora*, were tested at Kizimbani and this work continues. It appears, however, that under Zanzibar conditions maize rust may possibly not prove to be of such serious economic importance as it is on the mainland, for the rust in Zanzibar normally attacks plants after the cobs are formed and may have little effect on yield. In certain of the hybrids, resistance takes the form of hypersensitivity to the disease, the invaded cells dying so quickly that the fungus cannot become established in the host plant.

Pepper.—A block of black pepper was established at Kizimbani under the shade of *Cassia siamea* but has made poor progress.

Pineapples.—The use of a proprietary formulation of alpha-naphthalene acetic acid to induce early fruiting was the subject of experiments which were undertaken with the co-operation of a local pineapple grower. No difficulty was found in obtaining a crop of good fruit in the off-season about five months before normal time of harvest by applications to well grown plants. Although a pineapple canning industry is no longer a feature of the development programme, pineapples for local consumption and for local export are of some economic importance and it is intended to extend these investigations.

Rice.—The most interesting rice-growing activity at the Kizimbani Experimental Station this year has been an endeavour to grow a crop of rice under fairly dry conditions wholly by mechanical means. A number of ancillary problems were investigated at the same time, such as optimum fertiliser levels, and suitable seed rates and varieties for mechanically grown rice. The failure of the main rains seriously reduced yields and for this reason the results of the trial were a little disappointing. Nevertheless much valuable information was obtained. An outstanding problem is that of weed control, if hand-weeding is to be avoided, and a start was made to study the effects of selective weed killers some of which appear adversely to affect the rice. The mechanical production of rice has given rise to a large number of agronomic problems and their elucidation has been commenced by laying down two experiments to determine the best method of treating rice land between successive rice seasons. A good deal of investigation into this problem was undertaken some years ago but it is thought that the results of those experiments would not necessarily apply to rice grown under conditions of mechanisation.

Yams.—Demonstration plots were again a feature of extension work in the coral areas in order to show the value of new and improved yam varieties and of the use of compost and farmyard manure with this crop.

Ylang-ylang.—The blocks at Kizimbani were regularly harvested and yield records taken throughout the year. Flowers are produced mostly at the time of the rainy seasons, that is in April and in October and November. When sufficient flowers were reaped, experimental distillations were done by the staff of the Clove Growers Association at the clove distillery, and the oil obtained has been sent to the United Kingdom for valuation. Although the block is still very young, a yield of oil equivalent to 8.3 lb. per acre was obtained. There is still much to learn about the optimum stage for picking and the distillation of ylang-ylang, but there is every reason to suppose that this crop will prove a very suitable one for the Protectorate.

4. MECHANICAL CULTIVATION

The hire service of tractors and implements offered by the department, mainly to rice growers, was less popular this year owing partly to an increase in the charges and partly to the inclement weather which reduced the area of land planted to rice. As the large clove crop had brought money into the hands of cultivators, the Registrar of Co-operative Societies considered that rice-growing societies should not seek credit facilities for the hire of tractors and implements when preparing for the 1954 crop. It would seem, however, that facilities of this sort are essential if mechanical cultivation is to become popular with peasant-cultivators and they will be made available for the 1955 crop.

Six Ferguson tractors and ancillary implements were imported, but owing to difficulty in obtaining suitable senior staff the new rice cultivation scheme, which is an extension of the existing Experiments with Agricultural Tractors Scheme, could not be launched.

At Kizimbani a crop of rice was grown entirely by mechanical means and in spite of the weather a medium crop was reaped. The major difficulty so far encountered in the mechanical production of rice is the lack of a suitable implement to weed the young crop. A new seed driller proved entirely satisfactory for drilling rice, maize, and pulses and a low-volume sprayer proved to be a very useful piece of equipment especially for spraying herbicides for weed control in pastures and rice.

The greatest need in the field of mechanical cultivation is for an implement that will effectively control woody and perennial weeds in permanent crops, particularly coconuts. The low financial return per acre from coconuts precludes regular and thorough cultivation by hand, and in many parts of Zanzibar Island the coconut groves are in a bad state of neglect. Several implements of the bush-and-bog harrow type were tried without success but, after obtaining useful advice from the Colonial Agricultural Machinery Advisory Committee and visiting a demonstration in Tanga organised by the East African agents, two Marden weed-cutters were ordered and arrived at the end of the year. This implement, which consists of knives set along heavy rollers, effectively deals with fairly heavy weed growth and appears to be what is needed, although it has not yet been tried under all conditions. It is possible that the smaller makes of tractor may prove insufficiently powerful to pull the weed-cutter when conditions are adverse; in this case the initial cultivations could be powered by a larger tractor and more economic machines used subsequently.

If, as seems likely, the weed-cutter proves successful and can effectively deal with weeds in coconuts and other permanent crops, it is to be expected that plantation-owners will wish to hire the implement. This would provide most useful work for the tractors during the six or more months in which they are not engaged on cultivation for rice, and would help to spread the tractor overhead charges which at present are a considerable burden on the rice acreage.

5. STOCK HUSBANDRY

Kizimbani Stock Farm.—The selection and breeding of local Zebu cattle for milk production continued and the herd averaged 260 head during the year. There were no major management changes although the culling standard was raised from 2,000 to 2,250 lb. in 305 days in either the first or second lactation. The health of the herd was satisfactory except for an outbreak of East Coast Fever in which four animals died, one of them the highest yielding cow in the herd. The cause of this outbreak was the drought and consequent shortage of grass which caused neighbouring cattle-owners to graze their undipped cattle on outlying Government land. The outbreak was controlled by more frequent dipping and a rigid insistence on the regular dipping of all private cattle coming on Government land.

The average daily milk index (pounds of milk per cow in milk per day) was 8.85; this is the highest figure yet achieved. The other statistics of milk production also rose, the average output of milk per cow for the year being 2,294 lb. and the average yield in 305 days for lactations com-

pleted during the year 2,174 lb. There were some outstanding performers, one cow gave over 4,000 lb. in 305 days, the first locally-bred animal so to do, and one heifer gave over 3,500 lb. in her first lactation. There is no doubt that the Kizimbani herd continues to improve and there is as yet no sign of a ceiling being reached. Were it possible to cull poor cows after their first lactation and also to remove their daughters from the herd, higher average performance figure would be reached. But it is only through comparing the performances of daughters and dams that the worth of the bull can be assessed, and all female cattle must be allowed to complete two full lactations before being discarded. An article entitled "The Selection and Breeding of Zebu Cattle in Zanzibar" describing the results at Kizimbani was published in the East African Agricultural Journal in April.

During the year some seventeen selected bulls bred at Kizimbani were stationed at twelve places in order to provide free stud services to local cattle-owners. This notable step forward was not received as enthusiastically as was hoped although in some stations the bulls gave a fair number of services. It is expected that as the rural people get used to the idea and as the reputation of the Kizimbani herd spreads, greater use will be made of this valuable facility. One of the major difficulties in providing stud bulls for all rural areas is that these bulls have been brought up under tick-free conditions at Kizimbani and therefore cannot be sent to places where dipping facilities are not available. To overcome this difficulty in the future, a number of well-bred bull calves were stationed throughout the year on Government land remote from a cattle-dip so that they could contract East Coast Fever and, being young, have a good hope of recovery and consequently of acquiring a resistance to the disease. Furthermore, if such animals are to remain immune to East Coast Fever they must remain in the presence of infection. Although this arrangement is cumbersome no bull calves have succumbed to the disease so far and there is no doubt that this herd of salted young bulls will prove of considerable value in extending the work of the Kizimbani Stock Farm into the districts in the years to come.

Pasture Improvement.—Fifteen acres of new pasture at Kizimbani were planted to *Digitaria* sp., a local selection which has proved the most suitable grazing grass so far tried. *Digitaria* pastures planted from cuttings are ready for grazing six to eight weeks after planting and provide very palatable and nutritious grazing. *Digitaria* recovers quickly after grazing and a further point in its favour is its resistance to selective herbicides which are used for weed control at Kizimbani. Its main drawback is its relatively short duration although good management helps to increase its life.

In the grazing trial, Pemba grass *Stenotaphrum dimidiatum*, gave the highest figure for cattle days per acre but this may well be because Pemba grass is not so palatable as *Digitaria*. Amongst the cut fodders tropical Kudzu continues to provide most of the fodder and is a valuable standby in time of drought. An area of elephant grass, *Pennisetum purpureum*,

was planted and produced a useful quota of cut fodder. Seed of *Stylosanthes gracilis* was imported from Australia and established with considerable difficulty as germination was very poor. The plants are flowering freely but have not yet set seed. *Stylosanthes* is likely to become a very valuable addition to the range of cut fodders and it may be possible to plant up larger areas by cuttings if it continues to be a shy seeder.

A silo was constructed at Kizimbani and a crop of green maize was ensiled over a period of three weeks and compacted with the tractor. The temperature range was 97°F. to 117°F. and the silage produced was of excellent quality. It is found, however, that local animals do not take readily to silage and need to become accustomed to it when young.

Cattle Industry in the Uwanda Areas.—The beef herd was maintained under open ranching conditions on the Hanyegwa Mchana *uwanda* and numbers rose to 314 head by the end of the year. Twenty-six animals were sold for slaughter with a return of Shs. 3,400. The herd is still too young to be self-supporting financially but is making satisfactory progress. The loss of condition experienced at the end of 1953 ceased to cause disquiet and the animals' condition improved throughout the year in spite of the dry weather. An experiment designed to indicate whether mineral deficiencies were the cause of loss of condition at Hanyegwa was continued throughout the year. No increase in weight or condition was obtained by feeding either a balanced mixture of minor elements or by giving salt to the cattle. Although the possibility of a mineral deficiency under certain conditions is still kept in mind, it is now thought that mineral shortages do not occur under normal conditions. The electric fence was used mainly for night kraaling, the shortage of grass throughout most of the year necessitating free range by day.

Trypanosomiasis was less of a problem in 1954. This was due to systematic clearing of bush around the periphery of the grazing area and the relatively dry weather. The following table shows the average number of cases of trypanosomiasis per month together with these averages expressed as percentages of the total number of cattle present in the herd at the end of each year:—

		Average monthly cases		Percentage of total stock
1951	...	8.1	...	6.5
1952	...	9.9	...	3.8
1953	...	6.3	...	2.3
1954	...	5.6	...	1.8

Disease Control.—A noteworthy feature of the year's work of the Veterinary Section has been the acceptance of cattle-spraying at Makunduchi in the south of Zanzibar Island. Much interest has also been displayed in spraying as opposed to dipping in other rural areas. Dipping has always been unpopular with cattle-owners other than the owners of commercial herds of grade cattle. No attempt is being made to force spraying on unwilling cattle-owners but it is hoped that the current interest will spread. There is no doubt that spraying has many advantages over

dipping, the greatest being that it effects tick control rather than eradication and so maintains the immunity to East Coast Fever and other tick-borne diseases because repeated mild infections occur. On the other hand efficient spraying calls for very thorough supervision. In Pemba fair and regular attendance at certain cattle-dips indicated that some of the rural cattle-owners in that island appreciated the value of dipping.

E. Trypanosomiasis, which occurs very widely in Zanzibar Island but not in Pemba, has again been the principal disease dealt with by the ambulatory clinic which doubled last year's total number of cases treated. This indicates the confidence now being felt by cattle-owners in the treatment of this disease for which antrycide-methyl-sulphate continues to be a most effective cure.

Five thousand, nine hundred and seven cases of animal diseases were treated at the veterinary headquarters or at the rural clinics in Zanzibar. In Pemba 4,331 cases of animal disease, of which ophthalmia and fowl-pox were the most common ailments, were treated by the veterinary staff.

Tsetse and Trypanosomiasis Survey.—The original twenty square miles of typical clove and coconut plantation country in the Mwera area, which comprised the original survey, were extended a further nine miles to the south of the surveyed area and the area now reaches the northern end of the Tunguu *uwanda*, where a second ranching project is to be started. The regular examination of cattle in the previously cleared area has continued to demonstrate the effectiveness of the work done last year. For instance, in an interesting series of observations, the cattle of two similar areas, Pongwe and Binguni, showed 28 per cent and 25 per cent trypanosomiasis infection respectively before clearing. The Pongwe area was then cleared and the infection rate fell to nil and was maintained at approximately this level. The control area at Binguni was not cleared and an infection rate of fourteen to fifteen per cent has been observed throughout the subsequent year.

The two main problems which arise from this work are how best to increase the cattle population in a cleared area in order to take advantage of the reduction in fly incidence and, secondly, how to maintain the cleared area in a clean condition by stopping the re-growth of the thickets which can soon become again suitable for the fly to breed in. The people who live in these areas are very idle and are apparently quite prepared to see the disease return and their stock in danger again rather than slash the relatively small areas of thicket themselves.

In the Tunguu *uwanda*, systematic partial clearing of some 3,500 acres has been undertaken and it seems that the rainfall and depth of soil in this area are more advantageous than they are at Hanyegwa Mchana where the first stock-raising scheme has been in progress for some years. There is a widespread area of dense fly bush to the south of the Tunguu *uwanda* and experimental fly rounds with bait oxen are being regularly undertaken to ascertain the minimum distance from the bush beyond which

cattle may safely graze at various times of the year. Preparations were commenced for the provision of water for the ranching project, the intention being to use a wind-pump operating at a well, and negotiations were undertaken for land on which the necessary buildings will be erected. The work has been partially held up by difficulties of land tenure.

Thus a *cordon sanitaire* of fly-free country between the plantation areas of the west and the eastern areas of fly-infested bush now extends for some eight miles running north from near Kiwani Bay. Once again, the department has greatly valued the close interest taken and advice given by officers of the East African Tsetse and Trypanosomiasis Research and Reclamation Organisation in connection with this work.

6. FORESTRY

The forestry programme has grown still larger and now forms a considerable part of the departmental activities.

A start was made in acquiring the catchment area of the Masingini ridge on which the town water supply depends and where erosion is a very serious problem. Some 200 acres of private land adjacent to Government land on the ridge were surveyed and valued with a view to early acquisition.

The afforestation at Kichwele-Pangeni, which is being undertaken on poor Government land by the Prisons Department, was maintained and extended by a further eighty-four acres. Some of the early plantings at Kichwele have made excellent progress and now look very well. The other Prison afforestation area, at Walezo, was maintained but, owing to very infertile conditions, the young trees make very little progress.

The new long-term afforestation programme for the Dunga *uwanda* commenced by the planting of 150 acres of casuarina and eucalyptus trees. The annual target in this scheme is 200 acres, but labour is proving exceptionally hard to obtain, especially in the clove season, and the 150 acres that were planted were only completed with the assistance of the Superintendent of Prisons who supplied a large proportion of the labour. Beaconing and surveying continued in the next block of 250 acres to be planted in early 1955. Growth of the young trees planted this year has been excellent. Further south, in the same stretch of coral *uwanda*, an area at Ubago was selected on which to establish a 25-acre pilot plot on almost raw coral. Ten plots of trees thought to be suitable for this type of land were planted this year but it is as yet too early to comment on their progress.

The Dunga *uwanda* was declared an intended Forest Reserve and the Reserve Settlement Officer has started to hear the claims of neighbours and others.

At Makunduchi, in the south of Zanzibar Island, an area of 2,860 acres of coral bush has been selected, with the co-operation of the local villagers, as an experimental forest reserve. This project is an attempt to organise the felling, cultivation and systematic exploitation of typical east-coast bush in order to maintain fertility and yet obtain a maximum return from the system of shifting cultivation practised in these areas.

In the high forest of Jozani in the south of Zanzibar Island, the whole forest was surveyed and beacons, and the planting of *Calophyllum inophyllum* recommenced systematically. Twenty-eight acres in the more open, drier end of the forest were planted with this tree and are making very good progress. A house was built for a forest guard at Jozani. The Ngezi forest in Pemba has been declared an intended forest reserve and a Reserve Settlement Officer has been hearing claims throughout the year. A working scheme for the proper exploitation of this forest has been prepared and the forest divided into a number of compartments. The enumerations are completed in the first three compartments and it is hoped that exploitation will begin in early 1955. The commonest trees in the Ngezi forest are *Antiaris toxicaria* and *Odyendia zimmermannii* but it is intended to replant the more fertile areas with mvule, *Chlorophora excelsa*, which is indigenous to this area. A nursery has been established at Ngezi for mvule seedlings and the forest boundary planted with casuarina and bloodwood (*Pterocarpus indica*). The small pilot plot of mvule planted in 1953 under partially cleared shade has made excellent growth.

7. FISHERIES

The Fisheries Officer was on leave from June onwards so that for most of the year the Fisheries Section has been on a care and maintenance basis. Prior to the departure of the Fisheries Officer on leave the smaller fisheries vessel, the *Forerunner*, some forty feet in length and powered by a 30-horse power diesel engine, gave a 6-months' demonstration of commercial fishing with a view to interesting local fishermen in this type of vessel, which is considered to be ideal for local use. Considerable interest is being taken by local fishermen in the possibilities of powered fishing and the Fisheries Officer assisted in converting one or two locally-built craft. One local fisherman purchased a small powered fishing boat from Denmark, which arrived at the end of the year. There is no doubt that this interest is very genuine and provided such craft can be made available to local fishermen under a suitable system of financial assistance an important step forward in the fishing industry of the Protectorate will have been achieved. The Fisheries Officer spent part of his leave in the United Kingdom seeking a source of suitable vessels and he reported that a most promising type of fishing boat for tropical waters is constructed of impregnated glass fibre which is not affected by worm, rot or rust and needs no painting and very little maintenance.

8. EDUCATION

There were no pupils-in-training at the Kizimbani school this year.

The small school farm, which was started last year at Kizimbani by the boys of the Seyyid Khalifa Middle School, was found to be a more ambitious project than could be managed by the boys and was closed down. District staff paid regular visits to all school gardens and advised on their management, and a number of lectures were given by officers of the department to school teachers-in-training.

It is intended to give some agricultural training to some of the teachers from rural schools, and two teachers were given short courses of instruction at Kizimbani.

During the past year increased attention has been paid to the need for more publicity in regard to departmental activities and to the dissemination of advice and instruction on agricultural matters. The department is now responsible for a fortnightly broadcast. A printed version of the more suitable broadcasts is published in the Government weekly paper *Maarifa* and also printed as handbills for distribution by the district staff. On about ten or twelve evenings every month, when the travelling cinema van of the Information Office gives programmes at suitable rural areas, the local Agricultural Assistant also gives a short talk. It has also been possible during the year to arrange in conjunction with the Provincial Administration for members of the staff to give talks on animal husbandry in suitable rural areas.

9. DISTRIBUTION OF PLANTING MATERIAL

A list of planting material sold or distributed free to cultivators is shown as Appendix II. The Clove Growers Association provided funds to raise a large proportion of the clove seedlings and also for the production of planting material of cacao, derris and chillies. Colonial Development and Welfare grants also provided funds for producing clove seedlings and for the citrus and mango plants distributed under the Citrus Fruit Scheme which are included in the list.

10. GOVERNMENT PLANTATIONS

For the first time for some years the Government Plantations section of the department, which runs a number of clove and coconut plantations on commercial lines, showed a loss on the year's working of approximately £5,000. The small 1954-55 clove crop was the main reason for this year's loss as only 366 frasilas were harvested. The poor rainfall also had an adverse effect on the coconut crop, which was rather less than usual, and the revision of salaries and wages with effect from 1st January, 1954, was a heavy extra expenditure which had to be met. Nevertheless the agricultural activities of the section were continued efficiently. Some 6,000 clove seedlings were planted in open areas and over 6,300 young clove trees were treated for die-back disease. The section also planted a further acreage of derris and coconuts. The following tables show the year's harvests for cloves and coconuts compared with previous years:—

Cloves

Season	Green cloves		Dry cloves		Dry stems		Average price	
	...	lb.	...	lb.	...	lb.	cloves per 100 lb.	Shs.
1954—1955	...	40,480	...	12,811	...	3,290	Deposited	unsold
1953—1954	...	336,078	...	104,539	...	32,903	...	437.90
1952—1953	...	103,093	...	35,082	...	11,010	...	763.31
1951—1952	...	11,126	...	3,502	...	1,049	...	398.29

Coconuts

Year	Nuts gathered		Copra made		Nuts per ton		Average copra	
	...	...	...	tons	...	of copra	price Shs. per	100 lb.
1954	...	2,127,468	...	266	...	7,040	...	54.25
1953	...	2,490,490	...	270	...	7,282	...	57.73
1952	...	2,595,576	...	339	...	6,542	...	36.31
1951	...	1,846,194	...	239	...	6,725	...	59.65

A statement of revenue and expenditure in respect of the Government Plantations for the year is shown as Appendix I to this report.

11. PRODUCE INSPECTION

Deliveries of cloves of the large 1953-54 harvest continued to arrive, mainly from Pemba, throughout the first half of the year and occasioned increased work in this section. Clove and copra exports were above average and the high quality of exported copra was maintained by strict inspection prior to export and also by encouraging the production of better-quality copra by means of personal talks with copra makers in the copra market.

In conjunction with the Chemical Laboratory, the inspection of coconut oil, clove oil and seaweed was carried out. The latter inspection is at the request of exporters although it is not included under the Agricultural Produce Export Decree.

An important feature of the inspection work this year was a change in the manner of inspecting cloves prior to export. Instead of letting exporters make large bulks of up to 4,000 bags before inspection and packing, the Inspector of Produce now requires exporters to prepare a number of small bulks for each consignment, each bulk consisting of 250 bags only. The change was resisted by exporters at the beginning, but later it was generally appreciated that, not only did it enable the Inspector of Produce to make more thorough examinations and take more representative samples, but the physical task of making smaller bulks was far less burdensome on the labourers than was the old method.

Inspections under the Adulteration of Produce Decree are also made at all three ports in Pemba and the clove and copra markets in Zanzibar; and a second inspection of Pemba produce is made on arrival in Zanzibar. The results of these inspections are shown in the following table:—

<i>Produce and Origin</i>		<i>Deliveries (bags)</i>	<i>Passed (bags)</i>	<i>Failed for</i>		<i>Percentage of failures</i>
				<i>Excessive moisture (bags)</i>	<i>Extraneous matter (bags)</i>	
Zanzibar cloves	...	29,356	26,983	2,121	252	8
Pemba cloves	...	168,325	148,590	17,685	2,050	12
Total cloves	...	197,681	175,573	19,806	2,302	10
Zanzibar clove stems	...	9,616	9,423	102	91	2
Pemba clove stems*	...	106,623	103,133	192	3,298	3
Total clove stems	...	116,239	112,556	294	3,389	3
Zanzibar copra	...	172,263	166,681	5,582	—	3
Pemba copra	...	80,323	79,917	406	—	1
Total copra	...	252,586	246,598	5,988	—	3

*Not re-examined in Zanzibar.

12. CHEMICAL LABORATORY

For the fifth year there has been no Government Chemist on the staff of the department and although routine analyses were undertaken under the supervision of the Director the other work of the laboratory in connection with soil surveys and fertility was at a standstill. One thousand, eight hundred and fifty-seven samples were sent to the laboratory for analysis of which all but ninety came from Government departments. Many of the samples came from the Produce Inspection Section and included coconut oil and clove oil prior to export. Cattle-dip fluid, milk samples taken by public health authorities, town water supply samples sent by the Public Works Department and a number of Police samples concerning liquor and drugs made up most of the remainder.

The laboratory also issued 1,200 doses of pig poison to the Provincial Administration for vermin control and undertook a number of analyses for private firms mainly in connection with insurance claims.

13. PRINCIPAL AGRICULTURAL LEGISLATION

The following is a list of the more important agricultural legislation promulgated during the year:—

Decree No. 4	... Land Alienation (Amendment) Decree	20.3.54
	This amendment excludes the assets of co-operative societies from the protection of the principal decree and thus makes easier the granting of loans to such societies.	
Decree No. 16	... Land Alienation (Amendment) (No. 2) Decree	31.7.54
	This amendment excludes debts due to the Clove Growers Association from the provisions of the principal decree.	
Decree No. 26	... Copra (Amendment) Decree	25.12.54
	This amendment provides for a smaller quorum on the Copra Board and extends the life of the Board for a further five years.	
General Notice No. 242.	Notice of Intention to Constitute a Forest Reserve at Dunga Uwanda under the Forest Reserves Decree, 1950.	24.2.54
General Notice No. 67.	The Defence (Land Requisition and Personal Service) (Planting of Cassava) Order, 1954. Provides for the compulsory planting of Cassava.	6.4.54
Government Notice No. 79.	The Animal Diseases (Amendment) Regulations, 1954 ... Provide for certain exemptions from paying dipping fees.	6.5.54
Government Notice No. 108.	The Prevention of Cruelty to Animals Rules, 1954 ... Provide for the proper carriage of animals at sea.	16.6.54
General Notices Nos. 160 and 161.	The Defence (Land Requisition and Personal Service) (Rice Planting) Orders, 1954. Provide for the compulsory planting of rice.	23.10.54
General Notice No. 181.	The Plant Protection (Importation of Citrus) (Prohibition) Order, 1954. Prohibits the importation of citrus plants and fruit in an endeavour to avoid the entry of the Citrus Bud Mite pest into the Protectorate.	11.12.54

28th March, 1955

G. E. TIDBURY,
Acting Director of Agriculture

STATEMENT OF REVENUE AND EXPENDITURE OF THE
GOVERNMENT PLANTATIONS

REVENUE TO NEAREST £.

			<i>Kidichi</i>	<i>Selem</i>	<i>Mtoni</i>	<i>Chukwani</i>	<i>Jendele</i>	<i>Total</i>
			£	£	£	£	£	£
Cloves and stems	...	...	23	4	—	—	1	28
Copra	...	...	8,995	1,433	3,319	1,758	—	15,505
Coconuts	...	...	896	194	292	69	—	1,451
Coconut crops	...	...	—	12	186	97	22	317
Miscellaneous	...	...	343	275	199	28	4	849
Leased plantations	...	...	—	60	—	—	—	60
Hire of lorry	...	...	23	5	5	4	—	37
Rent of quarters	...	...	28	8	7	4	—	47
Total			10,308	1,991	4,008	1,960	27	18,294
<i>Deduct</i> value of produce brought forward	...	...	1,194	207	774	296	—	2,471
Total			9,114	1,784	3,234	1,664	27	15,823
<i>Add</i> value of produce carried forward	...	...	1,617	179	20	74	35	1,925
Total			10,731	1,963	3,254	1,738	62	17,748

EXPENDITURE TO NEAREST £.

			<i>Kidichi</i>	<i>Selem</i>	<i>Mtoni</i>	<i>Chukwani</i>	<i>Jendele</i>	<i>Total</i>
			£	£	£	£	£	£
<i>Personal Emoluments:</i>								
Headquarters staff	...	...	783	261	131	130	—	1,305
Field staff	...	...	1,167	318	298	133	—	1,916
Arrears of salary	...	...	428	143	86	69	—	726
Total			2,378	722	515	332	—	3,947
<i>Other Charges:</i>								
Transport and travelling	...	...	112	42	30	29	—	213
Materials and tools	...	...	78	24	10	10	—	122
Labour	...	...	8,550	2,325	2,471	2,161	208	15,715
Repairs to buildings	...	...	181	164	142	94	—	581
Fuel and maintenance of vehicles	...	...	133	100	60	32	7	332
Arrears of labour wages	...	...	1,000	299	271	259	28	1,857
Total			12,432	3,676	3,499	2,917	243	22,767
Profit	...	...	—	—	—	—	—	—
Loss	...	...	1,701	1,713	245	1,179	181	5,019

Appendix II

DISTRIBUTION OF PLANTING MATERIAL

Planting materials of food-crops are usually distributed free, plants of permanent economic crops are normally sold.

Avocado pear, grafted	...	Nos.	4
" " seedlings	...	"	26
Breadfruit, suckers	...	"	13
Cassava, cuttings	...	"	121,500
Chillie, seedlings	...	"	204,584
Clove, seedlings	...	"	281,108
Cacao, seedlings	...	"	5,737
Coconut, seedlings	...	"	215,338
Coffee, seedlings	...	"	18,733
Durian, seedlings	...	"	158
<i>Eugenia aquea</i> , seedlings	...	"	76
<i>E. jambos</i> , seedlings	...	"	14
<i>E. javanica</i> , seedlings	...	"	1
<i>E. malaccensis</i> , seedlings	...	"	5
<i>E. uniflora</i> , seedlings	...	"	2
Grapefruit, budded	...	"	585
Groundnuts	...	lb.	61
Guava, Chinese, seedlings	...	Nos.	20
Kapok, seedlings	...	"	1,967
Lemon, smooth, budded	...	"	2
Lime, budded	...	"	16,752
" seedlings	...	"	5,032
Litchi, marcotts	...	"	43
Maize	...	lb.	195
Mandarins, budded	...	Nos.	412
Mango, grafted	...	"	127
" seedlings	...	"	596
Nutmeg, seedlings	...	"	107
Oranges, budded	...	"	5,842
Pineapple, suckers	...	"	885
Pepper, cuttings	...	"	244
Pomegranate, seedlings	...	"	3
Pomelo, budded	...	"	22
Rambutan, seedlings	...	"	292
Rice, seed	...	lb.	856
Sapodilla, marcotts	...	Nos.	40
" seedlings	...	"	85
Soursop, seedlings	...	"	57
Sweet potatoes, vines	...	"	134,500

Appendix III

DOMESTIC EXPORTS, 1954

<i>Items</i>	<i>Unit of Quantity</i>	<i>Quantity</i>	<i>Value</i>	<i>Percentage of Total value</i>
	Cental of 100 lb.		£	
Cloves		216,373	4,031,946	77.95
Clove bud and stem oil	lb.	258,620	143,850	2.78
Copra	ton.	5,805	404,735	7.82
Coconuts	cwt.	19,039	26,759	0.52
Oil cake	cwt.	54,957	67,902	1.31
Soap, common and toilet	cwt.	73	281	—
Coconut oil	cwt.	79,540	410,251	7.93
Chillies	cwt.	542	7,120	0.14
Fruit, fresh	cwt.	1,122	3,593	0.07
Bêche-de-mer	cwt.	222	2,145	0.04
Tobacco, unmanufactured	lb.	13,540	508	0.01
Ox hides	cwt.	884	8,658	0.17
Skins, sheep and goat	cwt.	234	2,267	0.04
Livestock	No.	—	2	—
Forest products	value	—	609	0.01
Kapok	cwt.	290	4,432	0.09
Fibres, manufactured	ton.	93	4,345	0.08
Shells, marine	cwt.	3,892	20,938	0.41
Fish, dried or salted	cwt.	184	1,384	0.03
Fish, fresh	cwt.	4	17	—
Lime	cwt.	63	37	—
Seaweed	ton.	186	9,212	0.18
Other articles	ton.	—	21,680	0.42
		Total	5,172,671	100.00

Appendix IV

APPROXIMATE PRODUCTION OF CLOVES IN FRASILA OF
35 lb. FOR 35 CROP YEARS

(1st July to 30th June)

(Based on receipts of cloves at the Central Market and C.G.A.)

<i>Season</i>	<i>Zanzibar Frasila</i>	<i>Pemba Frasila</i>	<i>Total Frasila</i>	<i>Mean crop per season in 5-year periods Frasila</i>
1919/20	93,847	168,703	262,550	—
1920/21	231,831	316,446	548,277	—
1921/22	65,819	200,983	266,802	—
1922/23	291,417	690,498	981,915	576,809
1923/24	75,027	236,767	311,794	474,267
1924/25	240,952	520,490	761,442	574,046
1925/26	219,192	392,622	611,814	586,753
1926/27	203,843	529,186	733,029	679,398
1927/28	190,370	500,382	690,752	621,766
1928/29	74,828	125,740	200,568	599,521
1929/30	318,647	610,296	928,943	633,021
1930/31	51,796	201,320	253,116	561,281
1931/32	175,070	760,786	935,856	601,847
1932/33	242,772	244,594	487,366	561,170
1933/34	146,098	781,090	927,188	706,494
1934/35	360,037	503,415	863,452	693,395
1935/36	65,938	232,571	298,509	702,474
1936/37	45,096	351,568	396,664	592,636
1937/38	446,500	909,416	1,355,916	768,346
1938/39	39,879	115,211	155,090	613,926
1939/40	168,041	501,474	669,515	575,139
1940/41	146,323	575,277	721,600	659,757
1941/42	297,578	889,550	1,187,128	817,850
1942/43	40,049	223,691	263,740	599,414
1943/44	263,423	777,218	1,040,641	776,525
1944/45	200,417	459,396	659,813	774,584
1945/46	26,493	161,075	187,568	667,778
1946/47	170,280	924,329	1,094,609	649,074
1947/48	30,914	280,986	311,900	658,906
1948/49	81,700	310,971	392,671	549,312
1949/50	153,888	430,253	584,141	514,178
1950/51	158,588	1,081,786	1,240,374	724,739
1951/52	45,892	290,007	335,899	572,977
1952/53	91,417	82,328	173,745	545,366
1953/54	179,883	1,101,302	1,281,185	723,069
Average for 35 seasons	160,967	470,906	631,873	—

MONTHLY AND ANNUAL RAINFALL TOTALS FOR THE YEAR 1954 FOR STATIONS IN ZANZIBAR AND PEMBA.

		Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total 1954	Total 1953
Zanzibar Clove Areas															
Kizimbani	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Rainfall in ins.	0.89	7.36	4.52	9.78	9.85	0.55	1.64	1.60	5.00	13.27	6.12	2.68	63.26	79.63
	No. of wet days	8	9	12	16	14	7	10	10	12	20	21	10	149	176
Mkwajuni	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Rainfall in ins.	0.00	1.75	5.12	10.30	16.57	1.46	3.12	2.34	2.13	1.69	1.34	1.52	47.34	57.11
	No. of wet days	—	6	12	16	17	3	12	9	8	6	6	5	100	137
Selem	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Rainfall in ins.	0.99	3.31	5.10	8.94	8.92	0.33	2.55	1.82	3.30	8.16	3.14	2.82	49.38	63.69
	No. of wet days	8	9	13	20	14	5	11	10	12	19	13	8	142	180
Mkokotoni	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Rainfall in ins.	0.00	2.80	7.94	12.86	13.83	1.47	4.07	2.86	3.00	2.61	1.87	1.46	54.77	53.31
	No. of wet days	—	3	9	11	11	2	4	10	11	9	7	5	82	83
Mwera	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Rainfall in ins.	2.70	4.24	6.08	12.79	12.55	0.22	2.94	2.86	3.05	13.61	7.65	4.42	73.11	72.85
	No. of wet days	5	9	12	16	10	3	4	4	6	10	10	4	93	99
Zanzibar Non-Clove Areas															
Kisauni Airfield	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Rainfall in ins.	0.94	3.42	2.41	11.41	10.90	0.23	0.85	2.03	1.35	5.98	6.10	3.84	49.46	68.72
	No. of wet days	10	7	10	16	17	2	3	7	10	13	19	15	129	164
Victoria Gardens	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Rainfall in ins.	0.92	1.70	3.44	12.26	10.15	0.19	1.29	2.36	2.33	5.04	3.60	1.48	44.76	70.39
	No. of wet days	7	5	9	18	17	3	6	7	12	11	13	9	117	156
Chwaka	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Rainfall in ins.	0.29	1.29	1.54	13.89	13.36	0.97	1.96	1.67	1.47	5.83	0.92	0.70	43.89	85.18
	No. of wet days	6	6	6	17	19	9	7	5	7	6	4	1	93	139
Hanyegwa Mehana	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Rainfall in ins.	0.26	3.14	8.19	12.31	11.70	0.77	3.03	0.44	0.48	5.92	1.83	0.99	49.56	83.72
	No. of wet days	2	7	12	18	17	5	7	5	2	6	4	4	89	128
Makunduchi	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Rainfall in ins.	0.14	3.30	2.22	15.43	9.93	0.74	0.88	0.60	0.49	4.28	0.84	0.74	39.59	81.08
	No. of wet days	2	5	6	8	12	2	2	3	2	4	2	3	51	88
Muongoni	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Rainfall in ins.	0.81	1.31	2.51	16.82	10.93	0.37	2.25	0.26	0.13	4.30	2.00	—	*	73.68
	No. of wet days	4	8	12	19	12	5	8	4	2	6	5	—	—	118
Kisongoni	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Rainfall in ins.	1.80	6.35	7.15	11.43	10.93	0.91	2.72	1.73	2.57	2.70	0.63	0.57	49.49	70.07
	No. of wet days	4	9	14	17	20	3	5	7	12	9	5	4	109	152

Pemba Clove Areas

Matangatwani	...	Rainfall in ins.	...	0.14	2.63	4.02	21.94	10.82	3.98	1.99	3.50	1.17	2.01	6.79	0.05	59.04	74.23
	...	No. of wet days	...	3	6	10	23	18	8	10	10	12	10	14	3	127	168
Weite	...	Rainfall in ins.	...	0.14	2.30	2.98	26.33	12.24	4.59	1.84	3.40	0.80	4.24	11.88	2.88	73.62	88.92
	...	No. of wet days	...	3	6	14	21	20	9	8	12	8	10	14	4	129	159
Mkoani	...	Rainfall in ins.	...	1.00	1.61	11.78	27.01	20.13	4.57	2.25	4.20	1.23	1.79	8.82	1.21	85.60	102.79
	...	No. of wet days	...	1	4	11	19	15	6	4	8	5	6	16	4	99	152
Mtambile	...	Rainfall in ins.	...	2.03	1.84	10.65	29.67	20.45	3.86	2.55	4.29	0.61	0.79	7.52	5.59	89.85	108.58
	...	No. of wet days	...	6	7	13	23	18	11	8	13	10	8	15	18	150	177
Limbani	...	Rainfall in ins.	...	0.05	2.57	4.36	30.34	11.11	4.79	2.67	2.57	1.05	7.53	8.59	1.66	77.29	78.91
	...	No. of wet days	...	3	6	9	23	24	11	13	11	12	9	11	2	134	197
Wesha	...	Rainfall in ins.	...	0.46	4.03	4.58	25.54	11.71	2.72	0.93	2.12	0.69	1.11	6.78	2.38	63.05	78.88
	...	No. of wet days	...	6	5	12	22	19	12	10	9	14	7	17	10	143	172
Chake Chake	...	Rainfall in ins.	...	0.35	3.40	7.67	24.89	13.13	3.35	1.80	2.79	0.64	3.65	1.17	2.82	65.66	87.63
	...	No. of wet days	...	5	4	10	21	17	11	8	9	7	8	10	8	118	144
Chambani	...	Rainfall in ins.	...	0.54	2.69	4.28	35.39	23.19	5.18	1.90	1.72	0.87	1.27	1.33	1.38	79.74	95.56
	...	No. of wet days	...	2	4	8	20	17	6	6	6	6	6	9	9	99	123

Pemba Non-Clove Areas

Ole	...	Rainfall in ins.	...	0.52	1.73	1.33	27.31	11.80	3.63	1.50	2.57	0.45	1.76	0.51	0.41	53.52	77.09
	...	No. of wet days	...	3	5	10	18	19	13	7	6	6	7	10	2	106	145
Kigomasha	...	Rainfall in ins.	...	0.02	4.72	7.99	20.99	14.64	3.65	2.03	4.39	3.23	5.00	2.86	0.87	70.39	64.39
	...	No. of wet days	...	1	6	9	19	22	8	11	16	13	11	9	5	130	146

*Record incomplete.

